

In this issue

ABB  
AGC  
AkzoNobel  
DuPont  
Eczacibasi Group  
GDF SUEZ  
Goodyear  
Infosys  
Lafarge  
Roche  
Schneider Electric  
SGS  
Skanska  
UTC

# Energy Efficiency in Buildings

*An insight from companies*



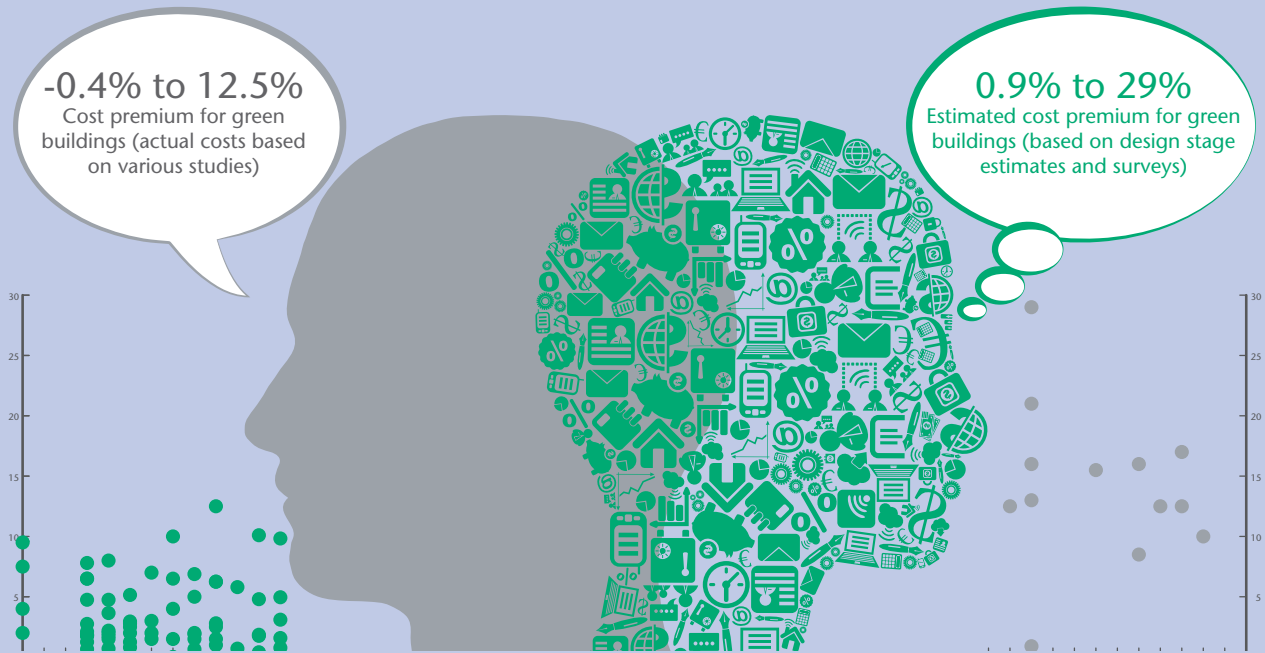
wbcSD buildings

Reduced energy consumption, and the consequent reduced energy costs, is one of the defining features of any green building.

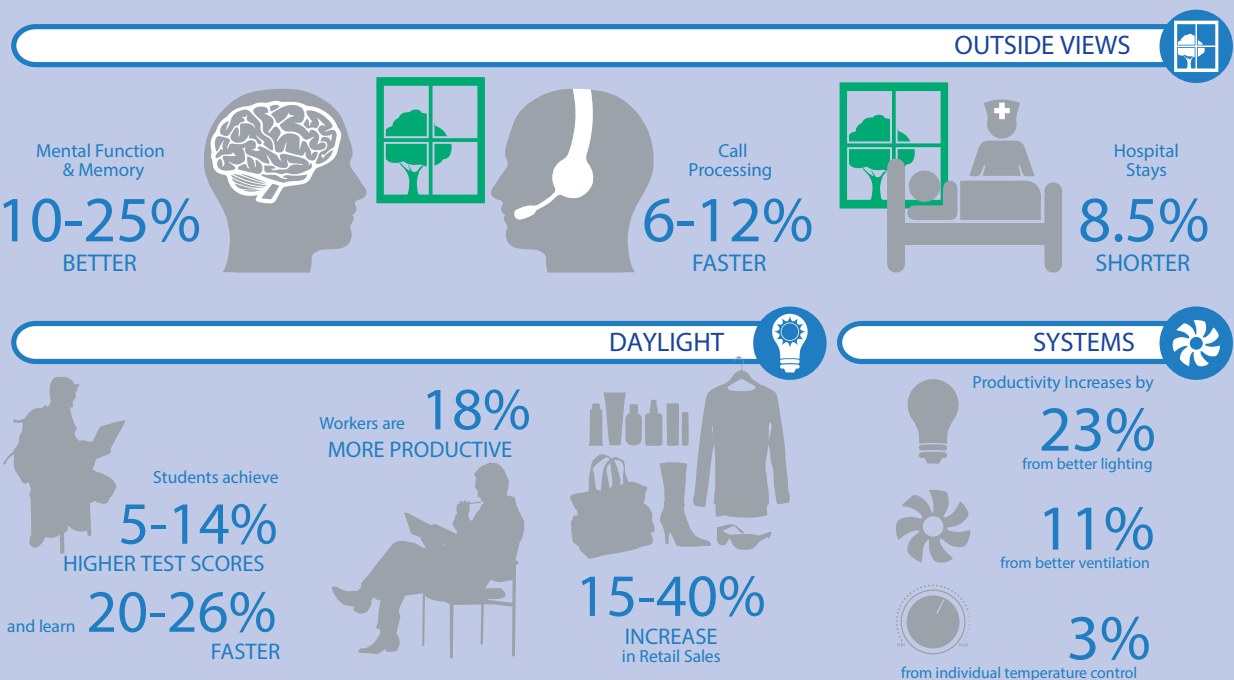
Estimates for the reduction in a green building's energy use compared to a conventional code-compliant building range from 25% – 30% (based on LEED-certified buildings in the United States) to up to 35% – 50% (based on a similar study of green buildings in New Zealand)<sup>1</sup>

*“Green building is now a global movement, and sustainability delivers benefits well beyond the environmental. People and businesses are also reaping the rewards of delivering better buildings.”*

**Michelle Malanca**, Vice President of the World Green Building Council



The Perception Gap<sup>1</sup> – Estimated vs. actual cost premiums for green buildings showing that the actual cost premiums for building green are lower than the industry estimates. Actual cost premiums have been taken from a wide variety of building types, including offices, homes, schools, warehouses, banks, supermarkets, health centers, community facilities, academic buildings, and public buildings.



Net present value analysis of the operational cost and productivity and health benefits of LEED certified buildings<sup>1</sup>.

# P

## roving the business case for Energy Efficiency in Buildings



By Peter Bakker, President & CEO, WBCSD

Buildings are the largest energy consumers in the world economy, accounting for over one-third of final energy use and approximately 30% of global carbon emissions.

Although they are far less visible consumers of energy (and emitters of CO<sub>2</sub>) compared to similarly energy-intensive sectors, such as transport or industry, buildings have a major role to play in any corporate strategy that aims to tackle climate change.

This is why the World Business Council for Sustainable Development (WBCSD) has selected Energy Efficiency in Buildings (EEB) as one of the key business solutions needed to address the challenge of climate change.

The Action2020 project has identified priority areas for business action that are based on scientific facts and social trends. A 'societal Must-Have' has been set for each priority area that business solutions should work towards achieving by 2020. The EEB 2.0 project will contribute to the climate change Must-Have. This says that in order to limit global temperature rise to 2°C above pre-industrial levels, the energy and industry systems should undertake structural transformation to ensure that emissions do not exceed one trillion tonnes of carbon (see box). Achieving this goal of limiting global temperature rise to 2°C would require a contribution from the buildings sector of approx. 80% reduction

in total CO<sub>2</sub> emissions by 2050 compared to today's level (IEA). The EEB 2.0 project will work with member companies and external partners to dramatically reduce the energy consumption of buildings to help achieve this required contribution.

The WBCSD's EEB Manifesto is a pledge that companies can sign in order to demonstrate their commitment to taking action in reducing the energy consumption of their buildings. To date, over 140 organizations have signed the Manifesto. **This publication presents the positive results that companies are seeing from their actions, highlighting successes but also the challenges that were overcome** in implementing energy efficiency measures in buildings. Investing in energy efficiency in buildings has a proven measurable effect financially and environmentally.

Even so, the journey from action to achieving results is not always easy. As part of the EEB 2.0 project, we have developed a Corporate Toolkit that guides companies and helps management prioritize and address those issues that save energy in a financially viable manner, allowing for reasonable returns on investment. The Toolkit is presented at the back of this publication.

I hope that the positive results described will inspire you to follow

the lead of the companies that have contributed. Our aim is to help more companies take action within their building portfolio so that businesses gain the clear benefits available from becoming more sustainable.

### Climate change Must-Have

With the goal of limiting global temperature rise to 2°C above pre-industrial levels, the world must, by 2020, have energy, industry, agriculture and forestry systems that, simultaneously:

- Meet societal development needs
- Are undergoing the necessary structural transformation to ensure that cumulative net emissions do not exceed one trillion tonnes of carbon<sup>1</sup>. Peaking global emissions by 2020 keeps this goal in a feasible range
- Are becoming resilient to expected changes in climate.

<sup>1</sup> - Anthropogenic CO<sub>2</sub> emissions from preindustrial levels as outlined in the IPCC Working Group I Fifth Assessment Report. One trillion tonnes carbon = 3.67 trillion tonnes CO<sub>2</sub>.



# Table of Contents



page

**01**

## **Introduction**

Proving the Business Case for Energy Efficiency in Buildings

page

**04**

## **Editorial**

Implementing Energy Efficiency in Buildings

page

**05**

## **A Pledge to Walk the Talk**

WBCSD Manifesto for Energy Efficiency in Buildings

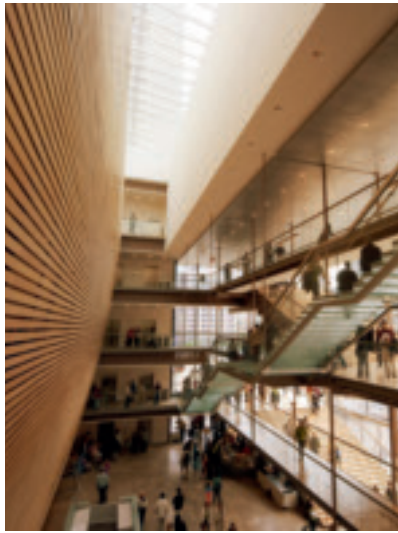


page

# 06

## Insights

- ABB
- AGC
- AkzoNobel
- DuPont
- Eczacibasi Group
- GDF SUEZ
- Goodyear
- Infosys
- Lafarge
- Roche
- Schneider Electric
- SGS
- Skanska
- UTC

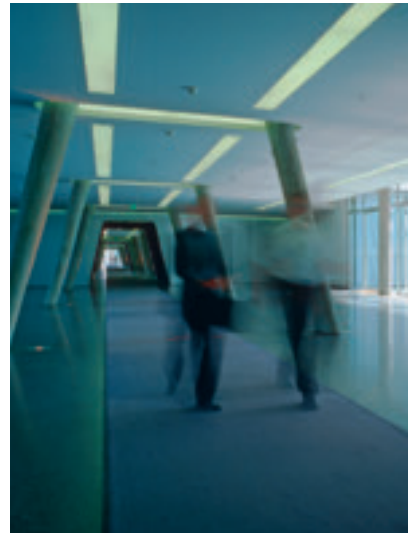


page

# 34

## Building Energy Efficiency Toolkit for Corporate Buildings

A "How to" Guide



page

# 36

## Scaling Up Solutions

The EEB 2.0 Project

# Implementing Energy Efficiency in Buildings



What 14 WBCSD member companies are doing to make their buildings more energy efficient

By Roland Hunziker, Director, Energy Efficiency in Buildings (EEB 2.0) project

The barriers to energy efficiency in buildings are well known: low and often invisible costs of building-related energy consumption compared to other core processes, split incentives between owners and tenants, uncertainty about returns on investment, competing priorities and an overall lack of awareness among users.

We asked WBCSD members who had signed the EEB Manifesto about how they work to overcome these barriers and drive energy efficiency programs in their buildings. Fourteen companies responded to our call, and their stories are told here, personally and directly by those involved in the decision-making process.

What we hear from these colleagues is that the walk has not been easy, but they have all identified concrete steps to improve the energy performance of their buildings, as part of corporate sustainability policy and with measurable actions on the ground. It is a continuing journey, but all of the examples show how an initiative starts and how early wins can be achieved to gain momentum.

A common message from all the case studies is that people matter.

Wherever a company has appointed dedicated and motivated energy managers, positive results have come in. And when employees of a company are sensitized and incentivized to participate in energy conservation campaigns, the results are even better. Top-level commitment is critical to make this happen.

*Wherever a company has appointed dedicated and motivated energy managers, positive results have come in.*

For most companies, overall energy goals are set at the highest level, and implementation is driven at the business unit level. Buildings are part of the overall scope and offer attractive and immediate paybacks. Some companies have a dedicated real estate policy, in which energy efficiency is embedded, with specific goals and appointed energy managers to oversee implementation. A few companies benchmark and even publish their figures. The challenges are the diversity of the building stock and the different functions performed within buildings.

Each insight contains a short description of some challenges encountered and how they were tackled. Together, they provide useful “lessons learned” for others who may still be at the start of their journey. To help in this process, the EEB 2.0 project is just about to finalize the Corporate Toolkit to Energy Efficiency in Buildings, which offers step-by-step guidance to developing an energy efficiency investment strategy for companies – an openly available source for everyone’s use. Read more about this Toolkit on page 34.

I would like to thank the colleagues at ABB, AGC, AkzoNobel, DuPont, Eczacibasi Holding, GDF SUEZ, Goodyear, Infosys, Lafarge, Roche, Schneider Electric, SGS, Skanska and UTC who have shared their stories. This is a great start. We will, of course, be interested to hear from more companies about their successes and challenges in implementing energy efficiency. We can display these on the WBCSD website and, who knows, perhaps in a second edition of this magazine!

# A Pledge to Walk the Talk

## WBCSD Manifesto for Energy Efficiency in Buildings

WBCSD members firmly believe that actions towards improving energy performance in buildings and creating a demand for energy-efficient buildings in local markets will be vital to achieving emissions reductions from buildings. The WBCSD decided to bring a Manifesto for Energy Efficiency in Buildings to all members, calling on them to take voluntary action.

140+ organizations have already signed it.

By signing the Manifesto, companies “walk the talk” and send a strong message to the market, stakeholders and employees.

By signing this Manifesto, the organization commits to:

- 1. Establish a baseline of energy use in the buildings it controls and set time-based energy and/or CO<sub>2</sub> reduction targets that will help to achieve transformative change.**
- 2. Publish a policy for minimum energy performance levels in its buildings.**
- 3. Define and carry out an audit program and implementation strategy to meet energy targets for its buildings.**
- 4. Annually publish buildings’ energy use, CO<sub>2</sub> emissions and progress against reduction targets, in the annual report or other publicly available document.**
- 5. Further promote building energy efficiency among employees and other stakeholders through e.g., advocacy, R&D, education and training.**

The Manifesto is available on the EEB website along with its implementation guide which provides general guidance for the five actions.

[www.wbcscd.org/buildings.aspx](http://www.wbcscd.org/buildings.aspx)

*At the end of the first EEB project, it was important that we established a commitment for action within the WBCSD. We are proud to again be co-chairs for the EEB 2.0 project, which we think needs to address broader market issues and opportunities for transformation. We will introduce the Corporate Toolkit to assist companies in creating their own EEB programs as well as sponsor targeted market stakeholder engagements to help local markets reach full potential. In the end, we believe this will benefit those who have signed the Manifesto and help to create vibrant EEB markets at competitive cost.*

**Olivier Chaudet**, Vice President,  
Building Segment, Lafarge

**Bill Sisson**, Director,  
Sustainability, United  
Technologies Research Center,  
UTC



Dr. Stefan Beretitsch leads ABB's sustainability real estate strategy, Green Corporate Real Estate Management. He is also ABB's real estate manager in Germany.

ABB

## Strategy at portfolio level

At ABB, our team of real estate experts has practised successful corporate real estate management for 25 years. Energy management is an integrated part of the ISO 14001 systems at our 550 sites and offices worldwide.

The ABB Green Building Policy was introduced in 2008. It provides guidance in two areas. First, it sets out the criteria for all new buildings: site selection, building design and the choice of materials to optimize the use of resources. Second, it details all policies required for rented space: new developments, refurbishment, and selection and management of the space. Our goal is to cut energy use by 20% between 2014 and 2020. Supporting this goal is a target to reduce building energy consumption annually by 2.5% measured as kWh/m<sup>2</sup>. The signs are good: energy consumption decreased by 3.5% between 2012 and 2013 despite growth in both production and employee numbers in our ongoing operations.

### Successful pilot approach in Germany

A highly successful Green Corporate Real Estate Management (Green CREM) strategy was developed and fully implemented in Germany as a pilot project. In 2007 we determined that 53% of overall energy consumption at ABB locations in Germany was attributable to buildings; the

rest was used in production. Our energy consumption throughout Germany amounted to 177,000 MWh or 56,000 tons of CO<sub>2</sub>, which accounted for annual operating costs of about € 10 million.

Since we launched Green CREM in Germany in 2007, we have reduced energy consumption by 35,000 MWh and CO<sub>2</sub> emissions by 8,000 tons.

### Extending to Europe and then across the world

Green CREM has been so successful in Germany, we are now implementing Stage 1 ("Energy Efficiency") of the CREM system across Europe as a precursor to extending the project across the globe.

Both this far-reaching Green CREM strategy and the use of the in-house ABB Energy Monitoring System are unique. They represent a new approach in the field of commercial-industrial corporate real estate management. They provide valuable references and differ from other current certifications (e.g., LEED, BREEAM) that are limited to determining the status quo of individual premises.



## A quick glance at the Green Corporate Real Estate Management (Green CREM) system

Green CREM system targets ABB's entire real estate portfolio. It includes a two-stage concept and the corresponding tools for implementing a sustainability system in the countries where ABB operates.

### Stage 1 Energy efficiency analysis of the real estate portfolio buildings

It comprises three levels:

#### Level I: Energy Monitoring implementation

The ABB real estate business unit developed its own Energy Monitoring System. For the first time, up-to-the-minute energy-related data from the corporate real estate portfolio can be accessed and evaluated at any time, and targeted measures can be derived to reduce consumption.

#### Level II: Technical assessment

A building's energy consumption is predominantly influenced by the building envelope (facade, windows, roof), building automation (HVAC, lighting), and energy management. The technical assessment of these factors is carried out at the determined sites in each country and analyzed.

#### Level III: Analyzing, identifying and implementing the most efficient energy efficiency projects

The data analysis provides an insight into the interplay between

energy consumption and the technical condition of the building elements. Respective measures for energy-related optimizations are then derived and evaluated in each country. All the identified measures and projects are evaluated and estimated according to their costs and saving potentials, resulting in each country producing a customized project list upon completion of the analysis.

### Stage 2 Analysis and evaluation of the ecological quality of complete portfolio sites – Green CREM Index

Stage 2 involves extensive consideration of sustainability-related issues. In this stage, a "Green CREM Index" is determined for all the relevant criteria of an industrial site – site quality, building quality, indoor quality, area management, water, energy consumption – as a basis for improving the ecological quality and sustainability. The index value serves as an indicator for necessary measures. Regular re-evaluations provide before-and-after comparisons following the implementation of measures and a constant insight into the level of environmental performance achieved.

## Profile

- Leader in power and automation technologies that enable utility and industry customers to simultaneously improve their performance and reduce their environmental impact
- Headquartered in Zurich, Switzerland, with operations in around 100 countries
- About 150,000 employees
- Revenues of US\$ 41.8 billion (2013)



### Building stock within program

Portfolio of around 8.8 million square metres of building space worldwide



### EEB Manifesto Signed in 2009

*Open-plan office building at the ABB location in Mannheim (Germany) from the 1970s. The refurbishment of this six-story office complex according to the Green CREM criteria has led to final energy savings of 44%.*





**Emmanuel Hazard**, Corporate Responsibility Director at AGC Glass Europe, ensured that the new European headquarters of the company outside Brussels met the highest energy efficiency standards.

AGC

## Moving towards energy efficiency

After signing the WBCSD's EEB Manifesto in 2009, we at AGC Group took some steps to increase the energy efficiency in our buildings.

In 2011, we moved our global headquarters to the Shin-Marunouchi Building in Tokyo, which is situated next to the Tokyo train station for a convenient and "green" commute.

### Global headquarters

In this existing office building we got a special in-house product installed to create energy savings from air conditioning by making use of existing windows. This product converts existing windows into high thermal insulation double-glazing windows by applying low-emissivity (Low-E) glass to the inside of the existing window.

We also installed an electricity monitoring system in each block on the different floors to reduce electricity use for lighting and other equipment.

Our goal is to reduce our unit power per area by 25% in 2015 compared to 2011. To date, we have reduced electricity consumption by 15% in 2012 and almost 20% in 2013, which meets our aim for cost savings in our offices globally, but especially in Japan, Europe and North America.

### Just the start

But our global headquarters was just the start.

In 2013, we moved all the head offices of the Group's glass activities in

Europe from different locations to one new building in Louvain-la-Neuve, just outside of Brussels. The new building was designed to consume nearly zero energy. We achieved this result by utilizing renewable energy produced on site. On the building's roof are 870 photovoltaic solar panels that have an output of 200,000 kWh per year. The building's façade combines solar-control double glazing with high thermal insulation. It also features a unique system of silk screen-printed automatic louvers on all sides of the building. The glass louvers are positioned horizontally on the south and north sides of the building to improve solar protection and glare control, and are positioned vertically on the east and west sides of the building to assure optimal daylight as well as visual comfort. The building utilizes natural materials and is equipped with geothermal installation (Canadian well system), with 42 wells at 75 m deep and 212kW heat pumps. In addition, it has a rainwater tank for toilet flushing, maintenance and gardening. We are pleased with the results of this move: the building's energy performance is two times better than the norm in the region.

The Group's efforts to reduce office energy consumption also present an excellent opportunity to demonstrate – by renovation or new construction – the energy efficiency performances and comfort aspects of our innovative building glass product solutions.

The AGC Group aspires to excel as a highly profitable and fast-growing global enterprise making contributions to a sustainable society by:

1. Having strong and differentiated technologies,

2. Incorporating environmental friendliness not only in our products but also in our production processes and business activities,
3. Contributing to the sustainable development of fast-growing regions.

Walking the talk by doing energy efficiency efforts on our own buildings fits our corporate vision as we wish to continue delivering solutions for environmental and energy issues in the built environment.

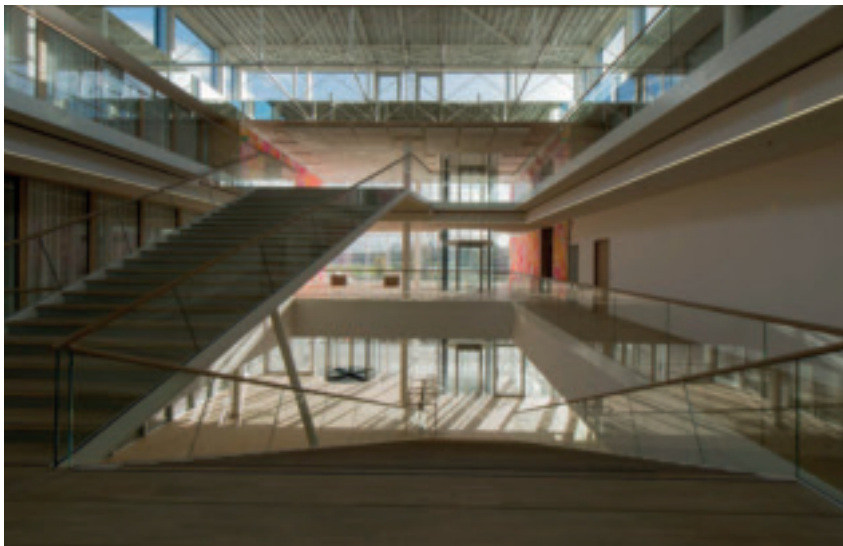


## Profile

- Global glass, chemicals and ceramics technologies and products provider
- Headquartered in Tokyo, Japan
- 49,961 employees worldwide (consolidated)
- Net sales of ¥ 1,190 billion (2012)



*Shin-Marunouchi Building, AGC's global headquarters in Tokyo, Japan*



**EEB Manifesto**  
Signed in 2009

*European Headquarters in Louvain-la-Neuve.*



Ruud Morssinkhof is Program Manager Energy of AkzoNobel's Operational Eco-Efficiency Team.

AkzoNobel

# A battle for focus

AkzoNobel chose to become a sustainable company in 2009. Ours has always been a top-down vision and we have always been supported by the highest level of senior management.

## Simple target

The target was simple enough: to reduce our operational eco-efficiency footprint by 30% by 2015. For the last five years, our operational eco-efficiency (OEE) projects assessed a range of energy savings, including savings in buildings, although 95% of our energy is consumed in processes and not in buildings.

Energy scans for over 100 sites were conducted. Of these, 75 were executed in about a day, 20 in about a week and 12 in a few weeks. Together with the local people, the team makes a list of potential projects that can save energy and prioritizes them accordingly. We assess the amount of energy each project is likely to save, the size of the project and the chance of success. Parallel to the project identification, the team also addresses the human aspects.

## People are key to achieve energy savings

When we started the program, we assumed any challenges would be technical ones. We've now realized that many techniques are available, and people are the key to energy savings. For them, it is a battle for

focus to free up time for energy.

Of course if a given site has an enthusiastic energy manager, he will spend time anyway, and energy use will go down. Quite rightly, a site manager's first focus is safety. His second priority is ensuring he can deliver a high-quality product on time. After these, there are a series of further competing priorities, of which energy efficiency is just one. By alignment of energy savings with these top priorities, the chance of success for an energy saving initiative will increase.

For instance, the site manager can increase the output from a given location by a combined production capacity and energy efficiency measure (e.g. reducing batch time).

## KPIs, reporting and feedback

We also went through several steps with energy management (and also the other OEE parameters, like waste and air emissions). We ensured there were measurements in place as a basis for KPIs, and that these indicators (like energy use per ton of product) were made transparent to the whole organization on a quarterly and yearly basis. These KPIs are discussed on many levels in the organization, and progress is



checked against our goal: a 30% OEE footprint reduction in 2015 vs. 2009. In 2013, 23-24% reduction was already achieved.

We also exploit state-of-the-art technology to help us. We have a dedicated website to track energy use per ton of product (and eight other OEE parameters) at each site. This means we know exactly how much energy is being used and which sites have highest priority. By visiting these sites, we distill our best practice and share approaches across the company.

The results have been impressive. For example:

- In Stenungsund, Sweden, we saved energy by optimizing the distillation section. It consumed 10,000 fewer tons of CO<sub>2</sub> and saved us more than € 3 million.
- In Barcelona, Spain, a boiler of hot oil was upgraded

with better control and heat recovery, resulting in 15% energy reduction and savings of € 26,000.

- In Arnsberg, Germany, an innovative new chiller has reduced energy use for cooling by more than 40%, and saved € 80,000.
- In Ibbenbüren, Germany, a new burner now allows us to use hydrogen, as fuel for the production of steam instead of natural gas.

#### Business and environmental drivers

The energy efficiency measures are driven not only by environmental concerns but also business ones. All the changes have made good business sense. We discovered that the average payback time is less than three years, with savings of approximately € 7.5 million.

## Profile

- Leading global paints and coatings company and a major producer of specialty chemicals.
- Headquartered in Amsterdam, the Netherlands, with operations in more than 80 countries
- 50,000 employees around the world
- Sales of € 14.6 billion (2013)



#### Building stock within program

All the AkzoNobel sites representing 450,000 square meters.



#### EEB Manifesto Signed in 2010

Headquarters in Amsterdam



Stanley Merritt, Sustainable Growth-Global Manager of DuPont SHE & Sustainable Growth Center, gives insight into the company's Bold Energy Plan.

DuPont

# Accelerating improvement in energy efficiency

We at DuPont have been concerned with sustainability and reducing the company's environmental footprint for more than 20 years.

This has translated into active participation in leading sustainability efforts, such as the U.S. Green Building Council and the WBCSD Building Manifesto program, that are committed to increasing and improving energy efficiency in buildings.

Our 2020 goal at DuPont is to reduce energy use by 10% per dollar of revenue compared to a baseline of 2010.

The commitment to continually improve energy efficiency is an extraordinary challenge. Difficulties include the broad dispersion of energy use within our plants, the invisibility of defects in our energy systems, and the need for additional expertise to find and fix those defects. To achieve the energy use reduction goal, our senior leadership set up in 2008 the Bold Energy Plan, a refinement of existing sustainability policies at various company locations, which calls for all plants to accelerate improvement in energy efficiency.

The Bold Energy Plan offers each location the following advantages:

- Senior leadership commitment and oversight;

- Dedicated leadership for plant efficiency programs;
- Local plant improvement targets and tracking of performance over time;
- Provision of capital for improvement projects;
- Networking among plant leaders and leveraging of expertise.

With top-down support, we now periodically review our inventory of buildings to identify buildings for inclusion in our energy efficiency in buildings plan that have metering capability required to produce EEB performance metrics. We also are committed to having all new DuPont commercial buildings constructed with utility metering and included in the EEB program.

Since 2008, we estimate our energy savings at 23.5 trillion BTUs, which amounts to US\$ 261 million.

## A long road, and not always an easy one

For us, the issue of energy efficiency in buildings has been an evolutionary process. We started with big items and are adding smaller facilities across the globe. But it has been a challenge to find the right people

who understand the energy information. We find that things progress rather quickly when the right person is identified. We now have established Energy Leaders in all regions to help pull the data together at major site levels, while we are still working on smaller facilities.

It also has been challenging to address buildings that are very old, such as our Experimental Station Lab,

which is more than 100 years old. We can monitor overall site energy and individual buildings that are newer. But there are a few buildings that retrofitting with meters does not make sense, so we take an overall approach in monitoring that includes audits to identify and implement energy conservation measures. These steps combined with the activities of the site facility engineers is how we deal with this unique problem.



The miracles of science™

## Profile

- A leading global research-and technology-based science company
- Headquartered in Wilmington, Delaware, USA, with operations in more than 90 countries
- More than 70,000 employees worldwide
- Annual revenue of US\$ 34 billion in 2012



### Building stock within program

Approximately 9.27 million ft<sup>2</sup> (or 861 thousand m<sup>2</sup>) are under the scope of the Bold Energy Plan (office, manufacturing and R&D lab)



### EEB Manifesto Signed in 2009

*Our Experimental Station Innovation Center in Wilmington, Delaware, was awarded the LEED Existing Building Certification by the U.S. Green Building Council.*



**Tuncer Kinikli** is Operations Director at Kanyon, the Group's facility management company. He is also the head of Eczacibasi's EEB Working Group

## The Eczacibasi Group

# Leading the way towards energy efficiency in Turkey

In Turkey, limited local energy resources mean that we are highly dependent on energy imports. So ensuring sufficient, reliable and economic sources of energy is a priority and energy efficiency is one of the easiest ways of tackling this issue.

The Eczacibasi Group began its energy efficiency in buildings efforts with our signing of the WBCSD Manifesto in 2010. We were the first Turkish company to do so.

In 2010, all Eczacibasi Group administrative and commercial buildings in Turkey consumed 27,906 MWh of electricity, representing 10% of the electricity consumption of our industrial operations in Turkey that year.

I am pleased to be able to say that our EEB investments have delivered substantial and quick results: between 2010 and 2013, we achieved combined energy savings of 14% in our commercial and administrative buildings in Turkey with a return on investment of 38% in three years.

Here's how we did it. After establishing an EEB working group with the support of our CEO, we determined how building managers measured energy consumption in the 20 buildings in our portfolio. The next step was to carry out a systematic study of building features, functions and energy-use equipment; insulation problems; energy consumption data; lighting systems

and electrical appliances; and alternative energy options. Because of the diverse features and functions of the buildings in stock, benchmarks were set for functions, based on usage rates and building features, rather than for buildings.

### Energy efficiency measures

Many of the projects the working group developed, apart from improving insulation, involve the replacement of less efficient lighting, heating and cooling systems with newer, more efficient ones. These include condensing boiler cascade systems in place of central furnaces, VRV systems in place of split ACs, LEDs in place of fluorescent lights, and the installation of solar water heaters on the roofs of several buildings.

Other projects include the replacement of inefficient automation systems with manual controls based on sensors, and the installation of frequency converters on selected pumps and motors.

Our largest project involves the installation of a 400 kW cogeneration microturbine at our Kanyon property in Istanbul that will enable us to



produce 2,000 MWh of electricity per year from the natural gas we use to heat water. This amount represents 17% of Kanyon's electricity consumption and 10% of the entire electricity consumed by our commercial and administrative buildings in Turkey.

### Overcoming obstacles

We had to overcome obstacles, including dealing with the fact that our administrative and commercial buildings in Turkey are in many different locations and have diverse features and functions, which made harmonizing and making sense of the data challenging. But, in the end, some previous work with Istanbul Technical University to evaluate energy use served us well.

### Future savings

On a building-by-building basis, we project that savings will range from 5% to 42%, with rates of return generally within five years and often less than one year.

## Profile

- A prominent Turkish industrial group including 41 companies with core sectors in building products, pharmaceuticals and consumer products
- Headquartered in Istanbul, Turkey
- 11,730 employees
- Combined net revenue of € 2.6 billion in 2012



### Building stock within program

20 commercial and administrative buildings in Turkey covering approximately 150,000 m<sup>2</sup>



### EEB Manifesto Signed in 2010

*Kanyon shopping, office and residential facility in central Istanbul*



**Bernard Loubière** is Vice President of real estate at GDF SUEZ.

GDF SUEZ

# Leading the energy transition

One of our main objectives is to be a leader of the energy transition in Europe. As well as focusing our business on renewable energy, we provide energy services such as helping our clients reduce their energy consumption. Energy efficiency is also part of our real estate policy, even though the energy consumed by our buildings represents less than 1/1000<sup>th</sup> of the energy we manage.

## Green Real Estate Policy

We began in 2008 by drawing up an inventory and auditing 130 buildings on 92 sites over 2000 m<sup>2</sup> in France. These first audits were outsourced but soon we realized that the Group should take advantage of its own know-how for a more robust approach to its own buildings. Signing the EEB Manifesto in 2009 brought support to the action.

GDF SUEZ has since established its Green Real Estate Policy (GREP) at Group level. Following its formal approval by the Executive Committee in October 2012, the policy became fully operational in May 2013. With 2008 as an indicative baseline, it set a target of reducing primary energy use by 40% by 2020 in its office buildings in France and Belgium, as these two countries represent 66% of GDF SUEZ's global stock. There is an opt-in policy for other countries. A full time project manager in the real estate unit oversees the GREP. The GREP has begun with three business units that represent 55% of the global building stock, or 1.2 million m<sup>2</sup>. Cofely Services, our subsidiary that specializes in energy efficiency, volunteered as one of the pilot business units to initiate the program.

The goal of cutting primary energy consumption by 40% by 2020 is expected to be reached by 2015 for two of the pilot business units. Asset management decisions under costs constraints are in fact very effective in terms of reducing energy consumption if sustainable development is taken into account. The key is that the GREP is not a stand-alone scheme – it has been incorporated into the overall real estate policy. Energy efficiency can contribute to reducing specific building costs and increasing work efficiency while improving quality of life for employees, their well being, and the attractiveness and image of the Group.

## The importance of data quality

One of the main challenges we faced was not only accessing data from all energy meters, but more specifically extracting what was relevant. Data can cover different activities and buildings, and so a complex matrix of data emerges. Field-tested within the GREP, we are now using our in-house energy-monitoring software tool to manage energy consumption and improve performance in our buildings.

**Next steps**

We will be extending the scope of the GREP to our other business units. Our clients will further benefit from the application of the GREP. It will remain a showcase for energy

efficiency offers: data management, audits, installation monitoring, equipment replacement, insulation, operation and maintenance of energy installations and the involvement of building occupants.

**Green Real Estate Policy – Main principles**

The GREP provides guidance for managing building stock:

- Begin even if data is incomplete, but plan improved data collection wherever possible.
- Target low-hanging fruit through real estate audits.
- Manage the whole building stock – this allows for trade-offs between buildings and therefore maintains costs and focuses expenses on construction, retrofitting or leasing of very efficient buildings.
- Introduce new GREP objectives in asset management contracts or green clauses in lease contracts when renewed.
- Improve continually through performance, drawing up contracts for energy services for buildings in operation.

In fact, don't wait, start now – be realistic, opportunistic and systematic, and you'll also save money.

**Profile**

- GDF SUEZ is a global energy player and an expert operator in the three key sectors of electricity, natural gas and energy services.
- Headquartered in France with operations in 70 countries
- 147,200 employees
- Revenue: € 81.3 billion (2013)

More on the GDF SUEZ Tower on the EEB website [www.wbcds.org/buildings.aspx](http://www.wbcds.org/buildings.aspx)



**Building stock**

Portfolio of approximately 2.7 million square meters  
60% of buildings owned  
40% leased



**EEB Manifesto**  
Signed in 2009

*GDF SUEZ Tower, the new head office in Brussels, is truly a showcase of GDF SUEZ environmental know-how in terms of energy efficiency. Not only has it been equipped with state-of-the-art thermal energy systems, but it also draws on alternative sources of energy, such as geothermal power – and on an unprecedented scale for the Brussels-Capital Region.*



**Aiman Abdrabou**, Global Manager – Energy/GHG, responsible for developing and implementing Goodyear's global energy, GHG and water strategies.

Goodyear

## More driven to reduce energy use

When it comes to energy efficient buildings, the Goodyear Tire & Rubber Company's "More Driven" slogan couldn't be more appropriate. The company set an ambitious goal: to be an industry leader, and it is well on the road to becoming so.

With top-down support, the company in 2010 established a formal five-year, 15% energy-reduction target for all global manufacturing operations and accepted the challenge to reduce energy consumption by 10% at non-manufacturing facilities by 2020, in accordance with the WBCSD EEB Manifesto.

By 2012, Goodyear had reduced overall energy consumption in non-manufacturing facilities by 16.35%. This reduction includes the global headquarters, innovation center, retail stores, warehouses and Goodyear commercial tire and service centers operations. Goodyear also reduced energy consumption in manufacturing facilities by nearly 9% from the 2010 baseline.

So how did one of the world's largest tire companies with 52 manufacturing facilities in 22 countries exceed its goal so quickly?

It started by infusing the Goodyear global community with champions for the cause, creating a global energy management position within the sustainability team and appointing regional energy

managers within each of the manufacturing strategic business units. In addition, more than 25 Goodyear plant associates became certified energy managers, accredited by the Association of Energy Engineers. Each Goodyear plant had at least one associate trained in using advanced software that can model lighting levels, technologies and power density before a major lighting project is approved, enabling the integration of new technologies, such as LED lighting in many facilities.

The company also designed and constructed its new global headquarters in Akron, Ohio, with energy efficiency in mind. The new building, completed in 2013, includes occupancy sensors, individual airflow controls, and utilizes white and vegetated types of roofs to reduce heat gain. These measures meet LEED requirements and resulted in a 51% reduction in energy consumption compared to the older building.

A new Goodyear manufacturing plant and office building in China also incorporated best practices and technologies to reduce its environmental footprint, including



the use of skylights for natural light and LED lighting system. The plant received certification as a LEED NCv2009 Gold Project.

When Newsweek magazine released its most recent rankings of the world's "greenest" companies, Goodyear was the highest-ranked tire company in the world. But it is not resting on its laurels. While pleased with the progress the company has made on the road to sustainability, Goodyear's energy managers' strategy is founded on a continual improvement methodology.

Although the company is now reaping financial and energy savings, the road to energy efficient buildings did have some bumps. Managers faced challenges in collecting data for buildings and in assigning a dedicated energy manager for each facility. These issues were surmounted by having regional managers oversee the energy strategies for buildings.

Goodyear will now continue adding the remaining non-manufacturing facilities to the full scope of the reporting and energy reduction strategy.

## Profile

- One of the world's largest tire companies
- Headquartered in Akron, Ohio
- Operates 52 manufacturing facilities in 22 countries
- Approximately 69,000 employees around the world
- Net sales of US\$ 19.5 billion (2013)

Goodyear reduced overall energy consumption in non-manufacturing facilities by 16.35% between 2010 and 2012.

SBU	Baseline 2010 Total BTU (MM BTU)	2012 Total BTU (MM BTU)	Total Reduction BTU 2010 - 2012 (MM BTU)	
Global HQ <sup>1</sup>	419,142	205,068	214,074	
Retail	605,946	591,640	14,307	
Warehouse	239,926	182,358	57,567	
Commercial and services centers	515,771	510,526	5,245	
<b>Total</b>	<b>1,780,785</b>	<b>1,489,592</b>	<b>291,193</b>	<b>16.35%</b>

1 - Global HQ is 2013 vs 2010

See more information on the EEB website on how Goodyear has implemented the EEB Manifesto [www.wbcd.org/buildings.aspx](http://www.wbcd.org/buildings.aspx)



### Building stock within program

Initial focus was on manufacturing operations (industrial buildings) with progressive ongoing extension to non-manufacturing facilities (commercial buildings).



### EEB Manifesto Signed in 2010

Goodyear's new global headquarters in Akron, Ohio



Rohan Parikh, Head of the Green Initiatives and Infrastructure

Infosys

## Question every assumption

Infosys is a global leader in sustainability. That's why, between 2008 and 2013, the company reduced the average per capita energy consumption on its campuses by 40% – while saving US\$ 50 million in operational costs. The secret of this success? Infosys is always pushing boundaries.

### Commitment at the highest levels

"At Infosys, sustainability is a way of being. It is not something we do beyond business; it is about our business". This statement, by S. Gopalakrishnan, co-founder and executive vice-chairman at Infosys, is a clear indication of the commitment to environmental sustainability that is imbued in the company's overall vision.

In 2007, Infosys made a voluntary commitment at the United Nations to reduce energy intensity by 50% in their Indian operations by the end of 2017. They committed to redefining corporate benchmarks, with the CEO monitoring progress every quarter. A Green Initiatives team was specifically established to test and develop progressive energy efficiency measures.

### Pushing boundaries

The fundamental premise of the Green Initiatives team is to "question every assumption." It makes sure consultants push the boundaries and propose the best systems. Overdesign – a common mindset in India – is to be avoided.

"It had to be unreasonable," says Rohan Parikh, Head of Green Initiatives and Infrastructure. "It had to be a paradigm shift." Infosys aims for LEED Platinum/GRIHA 5-star certification as a minimum standard for all new buildings (since 2008), 100% renewable energy and net-negative water consumption by 2018.

If the targets sound ambitious, the means of reaching them are truly radical.

For example, explains Mr Parikh, the company has moved to performance-based contracts. This effectively forces project teams to practice integrated design by withholding fees if performance goals are not met. "We understand you're the creative guys," Mr Parikh told prospective architects of Infosys' building, SDB1 "But the only way you're going to work with us is if 80% of the floor space is day lit and the solar heat gain is limited to 1 W/sqft. The real kicker? You lose 25% of your fee if any building occupant requests a window blind." But because architects, engineers, and owners worked closely together, the performance goals were met,

he says, and SDB1 became the company's model for its next generation of campuses. "We not only design our buildings efficiently, but we also monitor the buildings accurately and continuously to make sure the efficiencies are maintained over time".

### "In God we trust, all others bring data"

This message from the executive chairman of Infosys, Narayana Murthy, reflects a fact-based approach to investments in energy efficiency.

A baseline was established at the outset to estimate the potential energy savings via metering. This was followed by identifying some 'low-hanging fruit' in the form of inexpensive energy efficiency measures. This built credibility with senior management, who then requested that the next level of energy efficiency measures be introduced.

A detailed list of possible energy efficiency measures with appropriate payback calculations for a five-year plan, were presented to the management team. Senior management was so impressed they asked for the plan to be completed within two years. Additional budget was granted to undertake major energy retrofits.

### Impressive results

The cumulative savings over five years have been impressive. The per capita energy consumption has reduced by 40% in the last five years, resulting in a cumulative savings of 465 million kWh. The average energy consumption in new buildings has reduced by 55%, compared to 2007 levels, to 90 kWh per sqm of floor space annually. Construction costs for energy efficient new buildings was no higher than before and the average return on investment for retrofit projects was less than three years.

## Profile

- Global leader in consulting, technology and outsourcing solutions
- Headquartered in India, 71 offices and 93 development centers in the United States, India, China, Australia, Japan, Middle East, and Europe
- 158,000+ employees
- Revenues of more than US\$ 8.1 billion (LTM Q3 FY14).

Find out more on Infosys' approach to energy efficiency in buildings in the Corporate Toolkit, version 1, available on the WBCSD website: [www.wbcd.org/buildings.aspx](http://www.wbcd.org/buildings.aspx).



### Building stock within program

A total of over 30 million square feet, with 2-3 million added every year. Infosys owns their buildings.



### EEB Manifesto Signed in 2010

*The Software Development Block 1 (SDB-1) on Infosys' Pocharam campus, Hyderabad uses the innovative radiant-cooling technology – the first in a commercial building in India*



**Jean-Marc Robic** is General Affairs and Risk Management Director at Lafarge SA and in charge of the My Low-Energy Office project. He discusses how the world's largest cement manufacturer is making energy efficiency in its buildings more concrete.

Lafarge

## Preparing for the future

We at Lafarge launched the My Low-Energy Office project in 2011, realizing that it was the right environmental and financial decision and that it would also better position the company for more stringent governmental requirements in the future.

We started by identifying 20 offices (10 in 2011 and 10 in 2013), in 15 countries, representing 85% of total office floor area, and established an energy baseline for each office. Then we proceeded to carry out an energy audit at each office, to identify potential energy savings.

### Large payoff for small changes

We began savings initiatives first that were no cost or low cost, including better time management of air conditioning and ventilation systems, adjusting the lighting of office premises during weekends and holidays, replacing 400W floodlight lamps with 100W LED lighting, and changing the time schedule of hot water generation and the distribution for heating.

The benefits were clear and encouraging. After one year, energy consumption decreased by 12% at the offices concerned (from an average 390 kWh/m<sup>2</sup>/year to 315 kWh/m<sup>2</sup>/year) and the average pay-back time for these energy saving initiatives was just three months.

We are eager to reap more energy savings moving forward.

### Keys to success

Buy-in from key people lies at the heart of our plan, which was initiated with full top-down support from our Group Chairman and CEO Bruno Lafont. We also engaged with country CEOs and sought employee engagement through a dedicated internal communications strategy to raise awareness and share best practices and behaviors among employees.

### Overcoming obstacles

Even with strong internal support, we faced an array of challenges. One of the biggest was to establish a common baseline for all the sites in the project.

There were also some technical, regulatory and market constraints for some projects. For example, our offices on multi-tenant sites generally pay fixed energy charges to the landlord, covering central



air conditioning and heating. This reduced the potential for energy savings measures at these offices. Elsewhere, upcoming lease breaks impacted the feasibility of certain projects. Finally, in one country, the existence of only one national energy supplier made the renegotiation of the office's supply contract impossible.

### Upcoming plans

As set out in our Low-Energy Office Policy and following our experience during the My Low-Energy Office

project, energy efficiency is now a key factor that we take into account when selecting new office buildings. For example, the new head office for our US operations, based in Chicago, is LEED-CI Gold certified, and the headquarters for our French operations was recently relocated to new offices in the southwest of Paris that have the HQE<sup>1</sup> Exploitation label.

1 - Haute Qualité Environnementale: High Quality Environmental standard



## Profile

- A world leader in building materials
- Headquartered in Paris, France
- 64,000 employees in 62 countries
- Sales of € 15.2 billion

### Four actions as part of the My Low-Energy Office project



### Building stock within program

20 offices (10 in 2011 and 10 in 2013), representing 85% of total office floor area (110,000 m<sup>2</sup> of office space)



### EEB Manifesto Signed in 2009



**Thomas Wolf, Chief Environmental Protection Officer,** describes Roche's journey towards energy efficiency in its buildings.

Roche

# Overcoming organizational challenges

At Roche we introduce energy efficiency in our buildings for one simple reason: because it works. We reduced our energy consumption from 190 GJ per employee in 2005 to 147 in 2013. From 2006 onwards, we formalized our journey towards energy efficiency with our Group Directive on Energy Conservation. This established a management framework to ensure that all decision-making at Roche supports efficient, appropriate and cost-effective energy use.

The Directive enforces three simple but fundamental elements. First, it is an energy conservation process that addresses organizational challenges and ensures that saving energy is not the sole responsibility of the 'energy people' but requires a contribution from all energy users. Second, the design of new energy-consuming items must follow a prescribed design process and standards for high efficiency. Finally, savings are to be realized by optimizing existing systems – continual commissioning, measurement and analysis, energy audits, benchmarking and economic analysis.

I recognized that in order to overcome the typical obstacles that impede energy conservation, clear management processes and financial models would need to be tuned up. We needed a framework that not only encourages and supports, but also stipulates, energy conservation. Issued in 2006 and endorsed by corporate management, the Directive stipulates energy efficiency standards and prescribes minimum energy performance levels. Binding for all parts of the organization, the Directive requires that all of us at Roche make energy conservation part of our daily business.

## Energy action plans

We establish energy targets for the entire Roche Group. All Roche companies are obliged to develop and implement energy action plans, which are updated twice a year. The status is monitored at a Group level to evaluate progress against targets and to assess the need for further actions.

We conduct energy audits which are undertaken either by Roche or third-party experts, to help sites identify and implement energy conservation measures.

## Ambitious but realistic targets

From the outset, we set ourselves ambitious but realistic targets. We are aiming for a reduction of our energy intensity (measured by GJ per employee) by 2% annually. This means a 20% reduction between 2010 and 2020. We also aim for 20% sustainable energy by year 2020. We are delighted – but not surprised – by our results so far. Since 2005, we have massively reduced our energy consumption to 147 GJ per employee in 2013. In other words, we have cut our energy intensity by more than 20% between 2005 and 2013.

### Each investment must stand the test of financial scrutiny

Energy conservation investments are assessed on the basis of the net present value (NPV) they yield in life cycle cost analyses. These take into account the low risk of energy efficiency investments, their wider benefits – increased comfort and productivity – and rising energy costs.

### Challenging design for new buildings

We insist that the design for new buildings is undertaken with a view to optimizing energy efficiency. Mandatory design reviews ensure that building projects are giving necessary attention to energy conservation and energy efficient design. This is a key success factor for us.

Our new buildings exceed building codes for energy efficiency and will use significantly less energy than similar buildings in their locations. These buildings will be a model of energy efficient design. Energy efficiency in our buildings is being

achieved through a number of different measures, for example:

- Facade design with optimized U-values and solar light transmittance, sun protection and limitation of transparent glass fractions;
- High-efficiency lighting measures (e.g., LED);
- Use of rejected heat for heating;
- Efficient variable airflow ventilation;
- Reduced flow-rates;
- Occupancy-based ventilation and lighting;
- Less demanding temperature and humidity settings;
- Alternative low-energy cooling concepts such as convection, natural ventilation, nighttime cooling, free cooling, adiabatic evaporative cooling, building activation cooling, chilled beams, groundwater based cooling;
- Layout optimization;
- Efficient pumps and motors;
- Energy recovery;
- Metering and monitoring systems.



## Profile

- A leader in research-focused healthcare with combined strengths in pharmaceuticals and diagnostics
- Headquartered in Basel, Switzerland, with operations in over 150 countries
- 85,080 employees worldwide
- Annual Sales of CHF 46.8 billion



### Building stock within program

All types of buildings: production, utility, office, warehouses, laboratories. Both owned and rented.



### EEB Manifesto Signed in 2010

*Under construction, Building 1 in Basel will be a model of energy-efficient design. It will be heated with rejected heat and cooled with groundwater, while setting new energy efficiency standards with its innovative facade and LED lighting.*



**Jean-Yves Blanc** is Vice President for Strategy and Demand Response, Energy & Sustainability Services. He also oversees the Schneider Energy Action plan, the company's in-house program to reduce energy consumption in its buildings.

Schneider Electric

# Making the most of our energy at Schneider Electric

The vast majority of Schneider Electric's energy consumption comes from our industrial activities. Energy represents only a small fraction of our costs. But it is still important to us, and we were keen to set an example by applying our own solutions to energy consumption in our buildings.

## 2005 – 2011: 15% savings

We achieved a 15% savings of energy, in kWh, between 2005 and 2011. We equipped our sites with new building management systems and updated equipment. These included almost 500 variable speed drives, 1,900 meters and hundreds of sensors and controllers. We replaced existing lighting with low consumption systems and installed more efficient heating units. By the end of 2011, several million euros had been disbursed for the program.

## 2012 – 2014: Additional 10% energy reduction target

We set a further goal of reducing our energy consumption by 10% over the three years between 2012 and 2014. To achieve this, the Schneider Energy Action (SEA) program combines all our expertise, from global energy knowledge to hardware and software solutions. In addition, we will implement services to sustain savings that have already been achieved.

The SEA details how each of our sites larger than 5,000m<sup>2</sup> have to

be connected to the Schneider in-house energy monitoring platform. An energy improvement plan is drawn up for each site, which also has its own dedicated energy manager, responsible for the delivery of all energy efficiency measures. The energy managers are accountable for implementation of energy conservation measures and also for sustaining results over time. The ISO 50001 standard for energy management should be achieved at 20 sites and, except for manufacturing sites, data centers, and laboratories, new buildings will have to consume less than 50kWh/m<sup>2</sup>/year. Finally, energy awareness is promoted through internal training.

## Excellent results with the Schneider Energy Action program

The SEA identifies opportunities for savings in key areas such as HVAC, air compressors, lighting and specific industrial processes. In 2012, we saved 21,700 tons of CO<sub>2</sub> and since 2011, we've had 65 ISO 50001 sites certified.



Some of our buildings have performed beyond our expectations. Our Smyrna R&D Center in the USA has reduced its energy consumption by 25% since 2004. The Hive building, our headquarters in France, has divided its energy consumption by four since 2008. Our Carros building, also in France aims to consume just 40kWh/m<sup>2</sup>/year for the new refurbished areas.

By the end of 2013, we achieved just over 8% in energy consumption savings from 2012. This means we are on track to achieve the 10% target by the end of 2014. Depending on the type of project, the average payback time has been between two and three years.

### Challenges

We have learned that without site energy managers and detailed and targeted energy action plans, energy efficiency measures are virtually impossible to implement. Specifically, if managers are given the means to monitor all consumption, as well as visible methods to track energy consumption and usage, energy efficiency savings become a reality much more quickly. Finally, Schneider is fortunate that it has always had a clear commitment to energy efficiency from the most senior levels of management.

### Profile

- Global specialist in energy management
- Headquartered in France with operation in 100+ countries
- 140,000 employees
- Sales of € 24 billion in 2013

#### Three pillars of the Schneider Energy Action

- Achieve continual overall reduction of electricity, gas, and oil consumption
- Implement the company's own solutions across all of its sites
- Raise employees' awareness of the new energy efficiency measures and help them understand how they can contribute to their development



#### Building stock within program

More than 300 sites covering 90% of the Group's total consumption in buildings.



#### EEB Manifesto Signed in 2010

*The Hive building, Schneider Electric's headquarters in France*



Eddy van Eeno with Lëss the polar bear and Trevor Pilbeam, the two energy management experts in the Corporate Sustainability team.



SGS is not an energy intensive company, but with over 80,000 employees and more than 1,650 premises, targeting energy consumption at our offices and laboratories is the best way we can contribute to tackling climate change.

SGS

## Huge diversity means exciting challenges

Our greatest challenge is the huge diversity of our company. Our building scope includes a range of laboratories, and these vary greatly. We have a hub-and-spoke model, with a wide spectrum of intensities. The activities of the laboratories also differ; a consumer testing services laboratory, for example, is likely to have a lower energy demand than a geochemical laboratory with powerful crushing machines. Within the business lines there is variation too; an industrial laboratory may be high-tech, or focused on more physical processes, such as welding or extraction. But the variety keeps things exciting, as it ensures we avoid an off-the-shelf response and instead develop solutions that are tailor-made.

### Targets and challenges

We aim to be a carbon neutral company, with targets that include a 10% reduction in carbon emissions by 2014 and a 20% reduction by 2020, from both our offices and laboratories.

We audit individual facilities with the help of the facilities managers in each location. The main challenge is electricity consumption. Heating

typically uses natural gas or gas oil, and we often reduce consumption by upgrading to more efficient boilers.

Cooling is required for both laboratories and offices, particularly in chemical laboratories. We look to cool the equipment itself rather than the whole room.

### Raising awareness

Raising awareness for employees is a key element of success. Our “Doing more with Lëss” campaign features Lëss the polar bear visiting different countries and encouraging simple changes. In 2013, after an initial pilot in Australia, he visited South Africa, Singapore, Spain, China, Portugal and India.

As a start, orange dots are placed on equipment – light switches, monitors, printers – to remind colleagues to be mindful of energy consumption.

### Results

The results have been significant:

- At our laboratory in Taunusstein, Germany, we replaced the oil-fired heating system for a new gas

one. We introduced a combined heat-and-power generator, condensing boilers, and an energy management system. This will save over CHF 369,000 per year and 716 tonnes of carbon emissions.

- At our Booyens facility in South Africa, upgrading our lighting, air conditioning and electric motor systems is expected to achieve annual savings of around CHF 50,000 and over 480 MWh.
- At our Geneva headquarters, we have optimized light and heating levels as well as adjusted settings on all equipment to minimize energy use. The amount of air conditioning the data center requires has been halved through the use of a 'cold aisle' to increase cooling efficiency. The building's electricity consumption has been reduced by 22% against the 2010 baseline, saving 17 tonnes of CO<sub>2</sub> per year.

### Future plans

We're keen to expand the range of our energy efficiency projects. We're looking at the possibility of using solar energy at our Brisbane building. We're also working on a pilot project, which uses the constant temperature found at depth in Antwerp harbor to cool the equipment in our nearby laboratory. We estimate this could save € 80,000 of electricity, around 800,000kWh, per year.

We've also launched a Green IT project in Antwerp, the latest in a series already implemented in Geneva, China, Hong Kong and South Africa. We reuse the air that has been heated by the servers to warm the offices, and free cooling will be used as the main cooling system. This will roughly halve electricity consumption for cooling the server room. We are also introducing interval monitoring to provide more accurate and timely energy consumption data.

	2010	2011	2012	2013	Target 2014
<b>Building energy intensity in SGS-owned offices</b> Annual kilowatt hours equivalent per square metre for SGS-owned offices	267	267	277	263	241
<b>Building energy intensity in SGS-owned laboratories</b> Annual kilowatt hours equivalent per square metre for SGS-owned laboratories	441	417	528	434	397

#### Building Energy Intensity

CO<sub>2</sub> emissions deriving from offices and laboratories decreased by 4.7% and 5.5%, respectively. This comparison uses the original scope of our Energy Efficiency in Buildings program to give a like-for-like comparison with a revised methodology; in 2013, the scope of this program has been extended to include 12 additional buildings. The results show that the new facilities tend to be less energy intensive.

## Profile

- World's leading inspection, verification, testing and certification company
- Headquartered in Geneva, Switzerland, with 1,650 offices and laboratories around the world
- 80,000+ employees
- Sales of CHF 5.8 billion (2013)



### Building stock within program

Surface area: 1,877,907 m<sup>2</sup>  
 Number of owned buildings: 202  
 Number of leased buildings: 940



### EEB Manifesto Signed in 2009

Headquarters in Geneva



Noel Morrin, Senior Vice  
President Sustainability & Green  
Support

Skanska

## Proving the case for green

Skanska aspires to be the leading green project developer and contractor in all its markets. The company has made significant progress in improving the energy efficiency of the projects it delivers to customers and the offices it occupies. Much of this progress can be attributed to Skanska's Green Initiative, which was launched in 2007, and Skanska's engagement with WBCSD on Energy Efficiency in Buildings (EEB), where the company was among the first to sign the EEB Manifesto.

Skanska's Green Initiative launched its Journey to Deep Green™, which uses the Skanska Color Palette™ to define green as a framework for strategic planning. For a project to be considered Green on the Skanska Color Palette, one of the criteria is that its energy performance must be at least 25% better than local code or relevant benchmarks. Skanska Business Units (BUs) use the Color Palette to set Green and Deep Green<sup>1</sup> targets, develop strategic action plans and selected BUs report on green order bookings and margins.

### Planning and implementation

The Green Initiative, the EEB Manifesto and sound business decisions have together led to widespread action on energy efficiency in buildings at Skanska. In recent years, action has manifested itself on a bottom-up BU level and increasingly on a top-down corporate level, with both influencing the energy efficiency of Skanska's own offices.

<sup>1</sup> - For more information see [www.group.skanska.com/en/Sustainability/Our-Journey-to-Deep-Green/](http://www.group.skanska.com/en/Sustainability/Our-Journey-to-Deep-Green/)

### Hollywood House, Woking, UK

Skanska convinced its landlord at Hollywood House in Woking to allow it to carry out a US\$ 5.4 million green refurbishment of the entire building between 2010 and 2011.

After two years of occupation, the renovation has reduced the building's energy demand by almost 50%, annual energy costs by US\$ 36,000 and carbon emissions by 58%.

Energy efficiency measures included connection to the district combined heat and power network, ventilation system modification, real-time energy monitoring and control systems, CO<sub>2</sub> monitoring, roof-mounted PV installation, efficient lighting, floor slab insulation, solar window shading,

enhanced building management system functionality and central power – off function for non-critical equipment. Decisions on energy efficiency measures were based on their business case and ROI, which was linked to the client's aspirations and other available income, such as government incentives. Skanska signed a green lease with the landlord, one of the largest property investors in Europe, which allows both parties to work together to ensure the building is operated as efficiently as possible. The overall ROI of the Hollywood House refurbishment is currently estimated to be less than 10 years. The Skanska office was awarded the highest LEED CI score in the UK at the time of certification with 96 points.



### Corporate leadership

Skanska's efforts to green its own offices have traditionally been driven by individual BUs, with a great deal of success. However, Skanska has taken an increasingly top-down approach to enhance the energy performance of its own offices in recent years as the company's corporate structures have matured to coordinate green efforts.

In 2009, Skanska's CEO appointed a Green Business Officer (GBO) with the mandate to commercialize green. The GBO was appointed to lead a newly established Green Leadership Team (GLT) in 2012. The GLT has senior representation from business units, corporate staff functions and the executive team. In 2012, Skanska's annual management meeting included an expert seminar on the business case for greening its own offices, and the GLT tasked one of Skanska's Expert Networks to define an approach to baseline major workplaces and further increase understanding of the green business case. The initiative used the EEB Manifesto KPIs to baseline 46 of Skanska's workplaces, and is using an international best practice platform to facilitate energy reporting and benchmarking.

### Business Unit action

In 2009, Skanska became the Empire State Building's first LEED CI<sup>2</sup> Platinum tenant as part of a refurbishment of its flagship office on the 32<sup>nd</sup> floor. The refurbishment reduced electricity costs by 57%, will save approximately US\$ 650,000 over an initial 15-year period, and had a ROI of five years. The project also improved the indoor working environment for office employees, and Skanska reported a reduction in absenteeism of 15 to 18% in the first two years. The Empire State Building 32<sup>nd</sup> floor renovation was not Skanska's first energy efficient office renovation, but the high profile nature of the project inspired other Skanska business units in the U.S. and Europe to green their own offices and realize energy and financial savings. It also inspired the owner of the Empire State Building to replicate Skanska's success throughout the entire landmark.

When developing and relocating to new premises, Skanska's BUs typically move from less energy efficient buildings to very energy efficient and even energy positive premises.

2 - Commercial Interiors, for more information see <http://www.usgbc.org/leed>

## Profile

- One of the world's leading project development and construction groups
- Headquartered in Stockholm, Sweden, with selected home markets in Europe, the U.S. and Latin America.
- 57,000 employees; and 10,000 ongoing projects
- Sales of SEK 136 billion (2013)

See further case studies on Skanska's offices on the EEB website [www.wbcsd.org/buildings.aspx](http://www.wbcsd.org/buildings.aspx)



### Building stock within scope

46 of Skanska's workplaces



### EEB Manifesto Signed in 2009

*Entré Lindhagen, Skanska's new global headquarters in Stockholm. The office offers a flexible and multi-faceted environment, which is self-sufficient in geothermal cooling.*





Sean West, UTC Energy and GHG Program Manager, is championing UTC's site energy efficiency efforts.

United Technologies Corporation

## A pioneer in energy conservation

At UTC we are proud of our stance as a global pioneer in energy management and conservation. We set our initial energy reduction goals in 1997. Between then and 2012, we reduced our absolute energy consumption by about 20%, while nearly tripling our overall business portfolio to approximately US\$ 60 billion.

### Signing the Manifesto and reviewing the building portfolio

At the time of signing the EEB Manifesto in 2009, UTC was already in alignment with the WBCSD's intent, having established energy baselines and progress reporting processes. We also had in place an energy policy, standard practices, and guidelines for managing energy use in our facilities worldwide.

In signing the Manifesto, we undertook the requirement to review our building portfolio and associated program initiatives. The review determined whether changes were necessary in order to both lower energy consumption and positively impact our business.

One specific consideration focused on whether to lower the annual reporting threshold – US\$ 100K – for sites required to report on energy use.

To address this point, UTC launched a pilot program in 2011 to capture the previous year's non-reporting building energy information at one UTC business unit. The results of the pilot showed that, for the

energy information collected, the pilot portfolio's average energy consumption was below levels estimated using established U.S. Department of Energy (DOE) baselines. It also demonstrated that lowering the threshold would not significantly impact our overall site performance. As a result, to minimize data collection burdens and costs for UTC properties that fall below the reporting threshold, the levels of energy will continue to be estimated by property type using established estimation procedures.

For now, as part of our overall reporting initiative, we plan to maintain our existing program structure under the terms of the Manifesto. However, the program's efficacy will be regularly monitored and any identified changes will be initiated in accordance with normal business practices.

### 2015 goals

In 2010, UTC announced new goals for 2015 to reduce absolute greenhouse gas emissions by 27% from all energy sources from the 2006 baseline. To date, we are on track to meet these goals.

While these goals will account for all sources of energy use directly from our reporting sites, including our buildings, they are being met by specific efficiency programs and energy decisions associated with all of our sites. Since 2007, UTC has invested more than US\$ 200 million in such energy conservation programs as lighting upgrades, HVAC improvements, combined heat and power (CHP) systems, and “Shut it off” campaigns. Average ROI is less than 5 years, and we have saved well in excess of US\$ 67 million per year in energy cost and deliver nearly 300,000 mt CO<sub>2</sub>e annual emissions reductions.

### Success with LEED certification

In 2010, nine of UTC’s sites received the U.S. Green Building Council’s LEED certification, most recently in Istanbul, Turkey and Monterrey, Mexico. More than 20 additional LEED projects are now in various stages of planning, construction and certification.

In 2007, Otis opened the world’s first green elevator manufacturing facility in China’s Tianjin Economic-Technological Development Area (TEDA). A LEED-certified Gold facility, the Otis Elevator Company

TEDA Center was designed and constructed to reduce site energy usage by a minimum of 25%. Key energy efficiency features include extensive day lighting and natural ventilation, cool roofs to reduce heat island effects, radiant heating in offices and the cafeteria, intensive insulation, high-performance windows, and rainwater collection for site irrigation.

Our Pratt & Whitney Global Service Partners Shanghai Engine Center is a state-of-the art facility with extensive aero engine part repair capacity. Opened in 2009, the 23,000 square-meter facility meets the Platinum standards of the LEED rating system.

### Focus on continued conservation

In 2009, UTC made a commitment to the U.S. DOE to reduce overall facility energy consumption by 25% in 10 years in our U.S. operations. In 2013, the DOE recognized us for slashing energy consumption across our U.S. operations by nearly 30% between 2005 and 2012. We take great pride in this achievement and remain aligned with the International Panel of Climate Change scientists’ target of an 80% reduction in emissions by 2050.

*Pratt & Whitney Global Service Partners  
Shanghai Engine Center*

## Profile

- Leader in high-technology products and services in the global aerospace and building and industrial systems industries.
- Headquartered in Hartford, Connecticut, USA, with more than 4,000 locations in approximately 70 countries representing 9.7 million square meters (2009); UTC companies do business in approximately 180 countries.
- 218,300 employees (2012)



### Reporting sites

We require all sites spending more than US\$ 100K annually on energy to record and report their consumption.

While this impacts only 10% of our sites (~300 in total), it accounts for nearly 70% of occupied real estate, by area, and 88% of energy use and GHG emissions from UTC’s overall buildings footprint.



### EEB Manifesto Signed in 2009



# A Building Energy Efficiency Toolkit for Corporate Buildings

## A “How to” Guide

Buildings consume about 35% of the world’s energy, which represents one-third of global man-made CO<sub>2</sub> emissions. Yet energy efficiency in buildings is often neglected as a source of energy – and therefore financial – savings for most companies.

This is why the WBCSD is publishing its new toolkit for corporate buildings. The Toolkit establishes a ‘how-to’ framework for businesses to become more energy efficient. It demonstrates, step-by-step, how companies can make energy savings, in ways that are financially viable and allow for reasonable returns on investment. It will not only help senior decision-makers to accelerate the reduction in energy consumption in new or existing buildings but also serve as a practical guide for energy managers.

*“Crucially, it speaks the language of business, for business.”*

**Olivier Chaudet**, Vice President,  
Building Segment at Lafarge

As such, the Toolkit is primarily aimed at medium-to-large corporations with a sizeable real estate portfolio and real estate management companies managing large tracts of commercial office buildings. But in essence, any company that wants to introduce change can use it to engage in a discussion with those who make



**Dr. Sekhar Kondepudi**, Associate Professor in the Department of Building at National University of Singapore and lead author of the Toolkit.

decisions on energy use in buildings. **The Toolkit addresses those people within an organization who are the decision-makers on corporate investments and those people who prepare these decisions.**

The Toolkit describes each necessary stage of the process – Vision & Goals, Planning and Implementation – all of which are underpinned by financial analysis:

The Vision & Goals stage centers around a small group – one or two individuals – appointed by a company’s senior management. This team will develop policies, strategies and procurement practices before setting specific short and long-term efficiency goals. Advice on how top-level buy-in can be secured early on to kick start the process is also included.

Planning involves allocating appropriate budget and human resources for a core energy team with different but complementary skills sets. This core team will establish the state of energy efficiency, develop benchmarks and conduct energy audits to establish baselines. This will lead to the identification of energy efficiency measures (EEM), which



*“The Toolkit can be used as a reference in conjunction with ISO 50001, the standard which assists organizations in improving the ways they manage their energy and resources.”*

**Alexandre Jeandel**, Corporate Senior Advisor on Sustainable Development at GDF SUEZ

can be assessed based on value generated, complexity and cost. The Toolkit offers a framework for this analysis as well as guidance to draw up detailed investment proposals.

A larger team is then created for Implementation. This consists of the original core energy team, as well as partners from contractors, consultants and energy service companies. Each EEM will be treated as a separate project, with its own timeline and operational plan.

**The Toolkit places a strong emphasis on financial requirements**, with detailed approaches that the energy team can take to evaluate and predetermine the financial viability of any given EEM. Different financial terminologies and analysis methods are outlined. What’s more, detailed case studies from Infosys, a multinational software company, are included throughout. As examples from other companies become available, they will be added to the

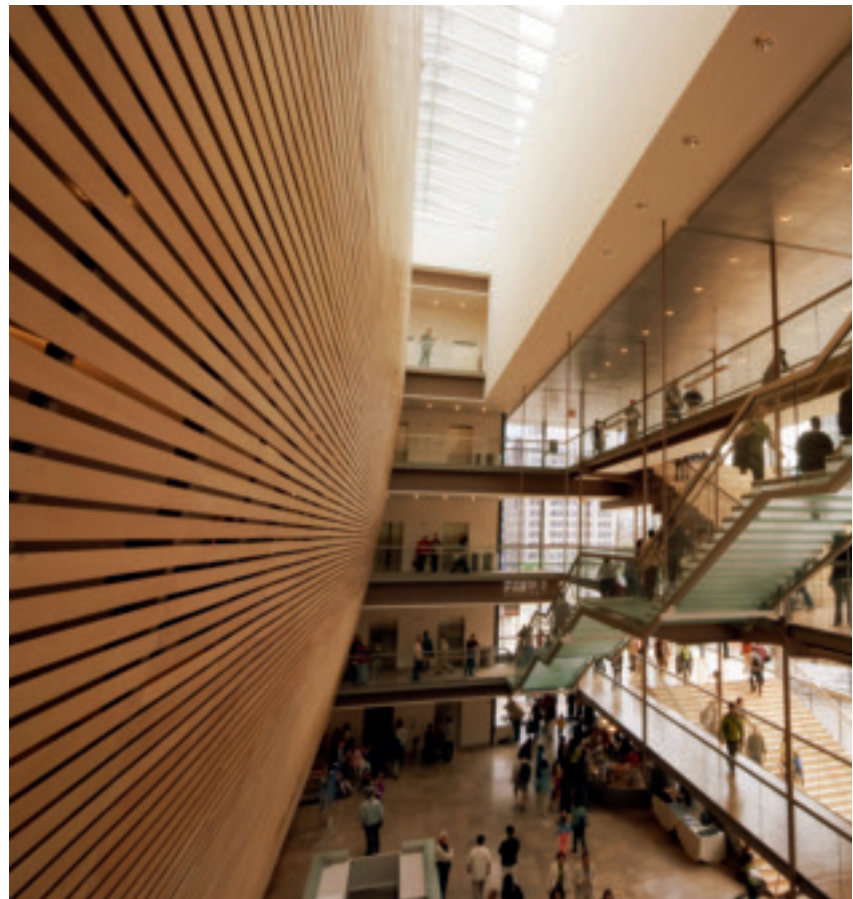
*“It is in the business interests of companies to make buildings more energy efficient and not just the interests of the environment.”*

**Guruprakash Sastry**, Regional Manager – Infrastructure at Infosys

toolkit in future revisions. Finally, wide-ranging reference material or ‘toolsets’ are provided to enable companies to determine targeted information related to all aspects of the process.

Improving energy efficiency is one of the best ways to reduce costs and increase productivity and profits. With WBCSD’s Toolkit, the private sector is now in a position to demonstrate the leadership we all need.

The Corporate Toolkit, version 1, is available on the WBCSD website: [www.wbcd.org/buildings.aspx](http://www.wbcd.org/buildings.aspx). After a period of road testing by companies, it will be reviewed, improved where necessary and eventually made available as an online resource available for all interested parties.



# Scaling up solutions

## The EEB 2.0 project

By Delphine Garin, Associate,  
Energy Efficiency in Buildings project, WBCSD



In 2006, members of the first WBCSD EEB project began extensively studying the barriers to energy efficiency in buildings.

This research became the *Transforming the Market* report and its accompanying roadmap, which laid out recommendations for achieving the transformation of energy use in buildings.

These findings make it clear that transformation requires action from across the building industry, from developers and building owners to policy-makers.

### From research to action

The second EEB project (EEB 2.0), which started in early 2013, seeks to implement these recommendations and take action for change. Its goal is to unlock financially viable energy efficiency investments that are not being realized because of financial, regulatory and organizational barriers. Action will also be triggered if we prove the value of energy efficiency to those building market stakeholders who make or influence decisions regarding building efficiency.

### Bringing market stakeholders together to remove barriers

We expect that decision-makers<sup>1</sup> who have control over larger portfolios of buildings need an organization that can act as a convener and expert voice, bringing together the principal stakeholders and driving a solutions-oriented process that produces a successful transformational outcome.

This is where WBCSD comes in. With the help of our project members, we have developed a structured stakeholder engagement process to rapidly diagnose and tackle key barriers to energy efficiency in local building markets as well as through

1. Decision-makers can be large corporates (occupiers, developers, investors) who implement and showcase best practice, or other actors in the building value chain who make or influence decisions by others at building portfolio level.

corporate and sector-wide initiatives. This process contains two steps:

- We call the first step an “EEB Laboratory”. Experts from the EEB project and partners gather those who can influence decisions related to energy efficiency in a specific market or sector in order to get a clear understanding of the market situation, barriers and opportunities.
- The second step is to move forward with identified decision-makers who are motivated to drive real change in their own business or markets by promoting the development of EEB projects.

### Key market engagements

We are pioneering at least eight market engagements to identify the value proposition of energy efficiency in buildings by stakeholder type in order to showcase “lighthouse” solutions that can then be scaled in other markets. These engagements will take place in major energy consuming countries, both developed and emerging markets, and in countries that offer leading examples of good practice: Brazil, China, India, the United States, Poland, and Singapore, just to name a few. By the end of 2015, the project seeks to influence 1,000 decision-makers across these and other markets to undertake ambitious actions to cut energy use in their buildings.

**Early results**

The early part of the project has been dedicated to learning how this pioneering approach can work on the ground. And we have already achieved some successes:

- Following an engagement with Infosys to learn about their corporate-wide EEB investment campaign, we developed the Corporate Toolkit that helps identify the business case and gives step-by-step guidance to companies. We will roll this out through WBCSD, Regional Network and other partner channels.
- Engagements in San Francisco, Shanghai and Mumbai have given us insight into the key issues and opportunities to

drive change in the local building marketplaces, e.g. the role a dedicated Mayor’s Task Force can play in convening the building sector, how developers can promote the integration of solutions, and also the importance of engaging end-users such as housing associations.

We will build on this early learning as we move forward with the project, and our members and partners will help us scale up and disseminate good practice identified through our on-the-ground engagements. We are all excited to work on this transformative project together, and we look forward to working with many of you who have taken time to read through this Magazine!

**EEB 2.0 project members**

- Lafarge (co-chair)
- UTC (co-chair)
- AkzoNobel
- ArcelorMittal
- AGC
- GDF SUEZ
- Infosys
- Schneider Electric
- Siemens
- SGS
- Skanska

**Project partners**

- International Energy Agency
- Urban Land Institute
- World Green Building Council
- WBCSD Regional Network

**Further information**

[www.wbcSD.org/buildings.aspx](http://www.wbcSD.org/buildings.aspx)

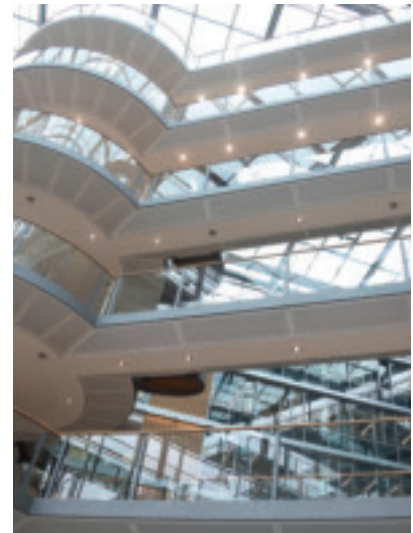
**Recommendations to Achieve Transformation of Energy Use in Buildings**

- Strengthen codes and labeling for increased transparency
- Incentivize energy-efficiency investments
- Encourage integrated design approaches and innovations
- Develop and use advanced technology to enable energy-saving behaviors
- Develop a workforce capacity for energy saving
- Mobilize for an energy-aware culture

Source: *Transforming the Market*, WBCSD, 2009



Source: *EEB Facts & Trends*, WBCSD, 2007



The fragmented value chain results in poor coordination between many relatively small players with different perspectives, such as owners, investors, building professionals, occupiers, utilities, regulators, financiers, etc.

This publication is part of the EEB 2.0 project.

The stories continue online at [www.wbcSD.org/buildings.aspx](http://www.wbcSD.org/buildings.aspx) where you will find additional insights from signatories.

The WBCSD will also continue collecting experiences and share inspiring stories to further prove the business case for investing in energy efficiency in buildings.

Are you interested

- to share your story?
- to sign the EEB Manifesto?
- to use the EEB Corporate toolkit?
- to know more about the EEB 2.0 project?

Please contact Roland Hunziker, Director, Energy Efficiency in Buildings project [hunziker@wbcSD.org](mailto:hunziker@wbcSD.org) or Delphine Garin, Associate, Energy Efficiency in Buildings project [garin@wbcSD.org](mailto:garin@wbcSD.org)

## EEB 2.0 Members



## Partners





## About the World Business Council for Sustainable Development (WBCSD)

The World Business Council for Sustainable Development is a CEO-led organization of forward-thinking companies that galvanizes the global business community to create a sustainable future for business, society and the environment. Together with its members, the Council applies its respected thought leadership and effective advocacy to generate constructive solutions and take shared action. Leveraging its strong relationships with stakeholders as the leading advocate for business, the Council helps drive debate and policy change in favor of sustainable development solutions.

The WBCSD provides a forum for its 200 member companies, which represent all business sectors, all continents and a combined revenue of more than US\$ 7 trillion, to share best practices on sustainable development issues and to develop innovative tools that change the status quo. The Council also benefits from a network of 60 national and regional business councils and partner organizations, a majority of which are based in developing countries.

[www.wbcd.org](http://www.wbcd.org)

### Disclaimer

This publication is released in the name of the WBCSD. Like other WBCSD publications, it is the result of a collaborative effort by members of the secretariat and senior executives from several member companies. A wide range of members reviewed drafts, thereby ensuring that the document broadly represents the majority view of the WBCSD membership. It does not mean, however, that every member company agrees with every word.

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